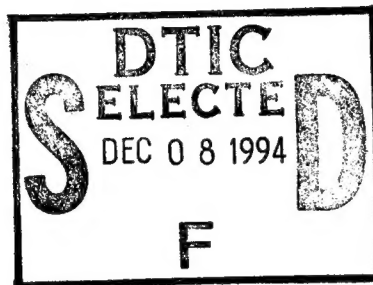


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# Changes in DoD Inventory Policy and Their Effect on the Atlantic Fleet



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MEMORANDUM

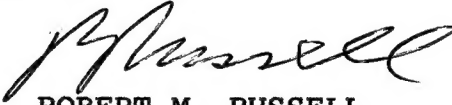
From: CDR Robert M. Russell, Seminar 7, Tele 5-0511  
To: MS Judy Clark

Subj: RESEARCH PAPER ABSTRACT

Ref: (a) Judy Clark memo of 4 April 1994

1. Thank you for your support by preparing my research paper cover sheet. I returned it to you with one word change. Please contact me if you did not receive the cover sheet.
2. In response to reference (a), subject abstract for research paper "Changes In DoD Inventory Policy and Their Effect On The Atlantic Fleet" follows:

In recognition of a changed world, Congress and the American people are reducing Department of Defense (DoD) Budgets. If we are to maintain a flexible and powerful force of the future, doing business smarter for less cost is essential. Changing the way we manage supply inventories is one way DoD has chosen to save money. The primary direction we are moving involves positioning supply material at centralized DoD depots while reducing or eliminating inventories located near the customer. The major conclusion of my paper is that inventory policy changes are working with minimum effect on readiness. That doesn't mean the fleet hasn't noticed a change or that the future portends the same levels of readiness. Also, now is the time to take full advantage of modern technology and make additional improvements to the logistics system with enhanced transportation and information systems.

  
ROBERT M. RUSSELL

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# INTRODUCTION

The world has changed dramatically in the last two years, and America's national security policy has also changed. As a result, the priorities of the Navy and Marine Corps have shifted . . . Our ability to command the seas in areas where we anticipate future operations allows us to resize our Naval Forces. . . We must structure a fundamentally different Naval Force to respond to strategic demands, and that new force must be sufficiently flexible and powerful to satisfy enduring national security requirements.<sup>1</sup>

In recognition of this changed world, Congress and the American people are reducing Department of Defense (DoD) budgets. If we are to maintain that flexible and powerful force of the future, doing business smarter for less cost is essential. Changing the way we manage supply inventories is one way DoD has chosen to save money. The primary direction we are moving involves positioning supply material at centralized DoD depots while reducing or eliminating inventories located near the customer. These decisions and other major inventory management changes are having some effect on naval forces. The questions are: "In what ways?" and "How much?"

With the demise of the Soviet Union, now is an opportune time to reorganize the way we do business in DoD. We can realize some of the "peace dividend." It's important, however, that we do things right. The systems we devise may not be easily changed again for a long time. In a rush to save critical budget dollars, DoD supply and readiness professionals must make changes with a full understanding of the consequences. I contend that readiness is more important than ever. With fewer ships and aircraft, there is less redundancy. Higher readiness of the remaining force will be necessary to compensate for fewer numbers .

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<sup>1</sup> Department of the Navy. FROM THE SEA--Preparing the Naval Service for the 21st Century. 1993.

The major conclusion of my paper is that inventory policy changes are working with minimum impact on readiness. That doesn't mean the fleet hasn't noticed a change or that the future portends the same levels of readiness. Also, now is the time to take full advantage of modern technology and make additional improvements to the logistics system with enhanced transportation and information systems.

### ***Time To Evaluate***

Since the major changes were introduced more than a year ago, we can determine some early "real world" impacts on the Atlantic Fleet and evaluate their progress. I will focus predominately on the positioning policy and inventory elimination but provide system perspective by discussing some other changes.

The Defense Management Report Decisions (DMRD) 901<sup>2</sup> and 902<sup>3</sup> started the process to save billions of dollars through inventory reduction and supply warehouse/depot consolidation. The DMRD's provided the genesis for centralized positioning of DoD material at inland Defense Logistics Agency (DLA) depots. These decisions affected all four military services with implementation starting in fiscal year 1991.

The Navy experienced major changes in inventory management including:

- Elimination of the intermediate level of inventory--DLA & General Services Administration (GSA) material at most Navy Supply Centers.
- Storage of Navy primary use material now stored at inland vice coastal depots located on naval bases.
- Storage of DLA material at their two inland depots closest to the vendor supplying the material.<sup>4</sup>

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<sup>2</sup> Defense Management Report Decision 901. "Reducing Supply System Costs." Nov. 1989.

<sup>3</sup> Defense Management Report Decision 902. "Consolidation of Defense Supply Depots." Nov. 1989.

<sup>4</sup> Michael Olson. "Inventory Issues at FISC Norfolk Today." Supply Corps Newsletter.

My subjective evaluation will start with asking some questions.

## ***Questions***

What were the consequences for the Atlantic Fleet of these fundamental changes?  
Has fleet readiness changed?

I will address these issues through a discussion of the following:

- History of U.S. Navy material positioning policy.
- Current DoD material positioning policy.
- Proposed (enhanced) DoD material positioning policy.
- Unique Atlantic Fleet operational requirements.
- Other DoD inventory management changes in work.
- Readiness impact--measurement, perceptions, and reality.

I will also provide an analysis of the actions initiated and potential changes. Finally, I will offer my conclusions, some alternate approaches, and my recommendation for future enhancements.

## ***Study Methodology***

The primary approach of this paper was an intensive review of point papers, related briefing materials (vu-graphs), Navy instructions and publications, and personal interviews. Although I intended to use empirical methods to illustrate changes in readiness due to these policy changes, it was not possible. No single acceptable measure of the impact of inventory policy changes on readiness is currently available.

Also, the situation was too dynamic with many simultaneous changes to inventory management procedures. Changes cannot be isolated to measure their impact. As the Atlantic Fleet Supply Officer stated, "We may be twisting too many knobs at the same time."<sup>5</sup> The inland positioning and inventory elimination are still in the implementation stages, so my findings and conclusions are preliminary in nature. They should be subjected to more analysis later.

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<sup>5</sup> David Ruble. Personal Interview. 21 Dec. 1993.

I approached this research paper with a personal bias against changes that degrade fleet support. Serving the past two years as Supply Officer, USS AMERICA (CV 66), I observed the initial inventory management changes from the operational level. Because I understand the need for operating a less expensive supply system, I support change to achieve that end. I hope my study will help clarify this complex change process. To compensate for my bias, I sought informed opinion and facts at all command levels. As one might expect, I found opinions to support many different conclusions.

Because it is the largest Navy supply activity serving the Atlantic Fleet, I use the Fleet Industrial Supply Center (FISC) Norfolk as my sole retail (customer level) supply center example. I believe, however, that my findings and recommendations apply to all FISCs.

## **BACKGROUND**

### ***History Of Navy Material Positioning Policy***

"Beginning in the late 1970's, under the Retail Inventory Management Stockage Policy (RIMSTOP), DoD authorized a three echelon (or layer) inventory system. At the lowest level, the Consumer Level provides tailored support to specific customers. The Coordinated Shipboard Allowance List (COSAL) and Aviation Consolidated Allowance List (AVCAL) are examples of Consumer Level inventories. Backing up the Consumer Level is the Intermediate Level of inventory, which supports both resupply of the Consumer Level and direct-turnover (DTO) requirements. The Consumer and Intermediate Levels are "retail" inventories, because stock is bought from the wholesaler (e.g., Defense Logistics Agency, General Services Administration) and resold to the ultimate customer. At the highest level, the Wholesale Level of inventory provides worldwide support for all customers. It resupplies both retail levels, and is the ultimate source of material for all customers."<sup>6</sup>

The three echelon supply system which started prior to the 1970's was designed

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<sup>6</sup> Michael Olson. "Inventory Issues at FISC Norfolk Today." Supply Corps Newsletter (Draft)

to place the maximum amount of supply material nearest to the demand--the customers. This principle was confirmed in 1978 in the Material Distribution System Study (MDSS) prepared for the Joint Logistics Commanders (JLC). The summary of conclusions follow:

- The DoD Material Distribution System (DODMDS) had excess capacity for peacetime logistics support.
- Twenty-seven Service and DLA distribution facilities were located in regions where three-fourths of the demand was generated (allowing air and water port gateways to represent overseas demand).
- The majority of distribution facilities were located on multi-mission complexes that represented a significant amount of the total DODMDS demand.
- The above summary conclusions indicated that major savings might be possible through closures and by positioning certain categories of material closer to customers. The modeling analysis subsequently supported this conclusion.<sup>7</sup>

At the Navy customer level, the Navy Supply System operated Navy Supply Centers (NSCs). Until 1991, Navy Supply Centers, at major Navy bases on the east, west, and gulf coasts of the U.S. performed integrated, multi-mission functions issuing retail and wholesale DoD and Navy material. Since then, the Defense Logistics Agency has owned and operated the warehousing operations at most NSCs under the Defense Depot System. With the start of fiscal year 1992, ownership of many Navy-owned intermediate inventories transferred to DLA. "This was purely a financial decision that traded an investment of approximately \$300 million in inventory in exchange for greater funding to support the Navy's operating forces."<sup>8</sup> The successor to the NSC, the Fleet Industrial Supply Center (FISC), stocks consumer level material and some categories of Navy special material. DLA continues to stock wholesale material with primary distribution sites (PDSs) at defense depots--New Cumberland, PA and Tracy, CA.

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<sup>7</sup> Department of Defense. Material Distribution System Study. Prepared for the Joint Logistics Commanders (JLC). July 1978.

<sup>8</sup> Michael Olson. "Inventory Issues at FISC Norfolk Today." Supply Corps Newsletter (Draft)

## ***Current DoD Material Positioning Policy***

A two echelon system--wholesale and consumer--is the current supply material positioning policy. It exists because of the need to squeeze cost savings out of a system designed to combat the worldwide Soviet threat. Starting before the demise of the Soviet Union, Congress applied political pressure to reduce the defense budget to control the federal budget deficit. Starting in 1989, the Defense Management Report Decision (DMRD) process was the DoD system used to achieve some cost reductions and avoidances. DRMDs 901 and 902 effected the major changes in material distribution and inventory management.

**DMRD 901.** DMRD 901 aimed at lowering supply system costs saving more than \$2.5B over the FY 91-95 period. The Navy's share of this savings initiative was \$900M. Four primary actions created these savings:

- Reduce Procurement Action Lead Time (PLT).
- Lower material prices through Buy Our Spares Smart (BOSS) initiatives.
- Reduce Consumer Level inventories.
- Reduce Intermediate Level inventories.

Reduction of intermediate inventories was projected to save \$471M in the FY 93-95 period. The DMRD decision makers believed that they could achieve elimination of intermediate inventories without an adverse effect on readiness if they initiated system communications and transportation enhancements.<sup>9</sup> A shortened purchase lead time offers less risk of stock-outs and requires less inventory as a reserve.

**DMRD 902.** DMRD 902 aimed at consolidating defense supply depots, saving over \$1.2B through FY 97. Major actions that would result in savings are:

- Consolidate the physical distribution management of all supply depots under DLA.
- Reduce base and headquarters costs.
- Reduce excess peacetime capacity by closing depots.
- Use existing capacity better.

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<sup>9</sup> Defense Management Report Decision 901. "Reducing Supply System Costs." Nov. 1989.

- Consolidate shipments thus save transportation costs.
- Reduce system development costs.

Although not discussed extensively during the DMRD process, all participants agreed that none of the changes would affect readiness. I will address this assumption during the analysis section.

**OTHER FLEET IMPACTS.** Besides the primary changes described above, the following ancillary supply inventory changes and their impact on the Atlantic Fleet must be considered:

DLA Closest to the vendor policy. With the elimination of the intermediate level of inventory, DLA's policy of storing material in the depot closest to the vendor became a larger problem. This was because the DLA inventory managers started to manage a bigger portion of each service's primary-use material and stored the material in DLA depots vice the service's own depot which was located closest to customers. That means that material bought from Colorado or Oregon firms would be shipped to Tracy, CA for storage. Material purchased from Florida or New York companies would go to New Cumberland, PA. When a fleet unit (ship or squadron) in Norfolk needs the component, the holding depot ships it.<sup>10</sup>

Fleet Industrial Supply Center (FISC) concept. In February 1993, FISC Norfolk was introduced to the fleet with the following notice to all Atlantic Fleet customers:

**FISC Norfolk will be charged with consolidating and providing various logistics management functions for shore-based customers within the tidewater area. One of these functions is direct management of consumer level inventories for major industrial customers. FISC Norfolk has already tailored its inventory levels for direct support of FISC customer operations. This effort resulted in \$30M inventory levels reduction to 9 COG repair part and consumable items.**

**The impact to the fleet is that routine requisitions will be referred to DLA/GSA stock points, vice filled locally by NSC Norfolk. It is hoped**

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<sup>10</sup> Michael Olson. Personal Interview. 14 Oct. 1993.

**DLA will position assets at DDNV to provide local support to the afloat customer. Issue priority Group I, bearer, and quick pick requirements will continue to be filled from FISC stocks if assets are available.<sup>11</sup>**

GSA Procedures. Included in the DMRD 901 process that eliminated the intermediate inventories at service depots was material purchased from the "other" wholesaler-- General Services Administration (GSA). GSA provides the most commonly used items such as paints and other corrosion control materials, paper products, hand tools, cleaning supplies, and office supplies. Ships use these items in great quantity and bulk. Also, because of the widespread use of many GSA items by most sailors, these items are ones that customers (ships) cannot be not-in-stock (NIS). They are considered "never out" items.

**Examples: Ships cannot be kept clean without soap and mops. Copying machines must have paper to operate.**

While the FISC SERVMART (low cost, high volume walk-in store) carries many of the highest volume items, FISC deleted many items, especially hazardous materials/flammables, when the intermediate inventories went away. Backup stocks for GSA material are stored at GSA depots located at Palmetto, GA and Burlington, NJ.<sup>12</sup>

### ***Proposed Material Positioning Policy***

In response to reaction from fleet customers, DLA is considering some mid-course corrections to the previously discussed policies.

**DLA STORAGE NEAREST TO THE CUSTOMER.** DLA plans to change the "closest to the vendor" storage policy because it is not the most cost effective in all cases. They are considering storage of material based on certain characteristics (i.e., hazardous) and according to demand--customer. If a service requires more than

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<sup>11</sup> Norfolk Center "Flash." Implementation of DoD Defense Management Report Decisions; Elimination of 9 COG Retail/Intermediate Levels At Naval Supply Centers. Fleet Industrial Supply Center, Norfolk. Defense Depot Norfolk, Va. 25 Jan. 1993.

<sup>12</sup> J. D. Maynard. "GSA Wholesale Asset Positioning at Norfolk." Point Paper. Undated.

25% of total demand for an item, DLA will stock the item at customer located defense depots--not to exceed three different locations. Since the Navy's major fleet concentrations are Norfolk and San Diego, DLA would position part of the material at these locations. The DLA inventory manager would then choose which of its PDSs to store the remaining portion of the whole. Another change under consideration is placing some of an item at each PDS if demand is random.<sup>13</sup>

**DISTRIBUTION/TRANSPORTATION ENHANCEMENTS.** In response to Navy urging, DLA entered discussions on ways to improve response times to Navy customers. Enhancements to the transportation and distribution system are the most likely ways. This process was preceded by a request to study Navy support from the DLA Executive Directorate of Material Management and the DLA Office of Plans and Policy Integration. They decided to conduct a comparative transportation cost and business pattern analysis for Navy requirements through the Defense Operations Research Organization (DORO Study ).<sup>14</sup> The conclusions of this study affecting the Atlantic Fleet are:

- The best "least cost" east coast location is Norfolk. This site is potentially \$9M less expensive annually than the next best east coast site which is New Cumberland.
- Customer distribution patterns are significantly different between DLA, Navy, and the Army (Air Force retail level data was unavailable for this project).
- Navy customers are highly concentrated around Norfolk and San Diego.
- Army customers are widely dispersed across the country.
- DLA customer patterns are less dispersed than Army's.
- A significant percentage of vendors are well positioned to support customers who are clustered near the best "least cost" east and west coast sites; namely, Norfolk and San Diego.

Based on these conclusions, the Commander of DLA, VADM Ed Straw,

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<sup>13</sup> Michael Riley. "DLA Stock Positioning." Telephone call notes. 29 Oct. 1993.

<sup>14</sup> Defense Operations Research Organization. Comparative Cost and Support Pattern Analysis For High Demand Navy Customers Under A Single Site Storage Option. July 1993.

recommended further study to validate the conclusions with the possible result of stocking DLA wholesale material closest to the customer.<sup>15</sup> He later decided to back the DORO study recommendation and store Navy material near the customer when it makes good business and readiness sense.

Other talks between DLA and the Navy Supply Systems Command involved using dedicated truck service to Norfolk and Jacksonville for Issue Group (IG) II (medium priority) and III (stock replenishment/low priority) material. This would involve daily trucks that move on a schedule whether full or not. If requirements generate multiple truckloads on a given day, surge trucks will be available. Additional talks concerned greater use of Navy Quicktrans vice commercial, small-parcel carriers for urgent high priority/CASREP requirements.<sup>16</sup> DLA conducted a direct delivery test 1 Apr-31 May 93 between New Cumberland and Norfolk. With 683 items shipped to Navy Shipyard and Naval Aviation Depot Norfolk, material arrived in two days or less in 99% of the cases.<sup>17</sup>

**TOP 100 PROGRAM.** A program initiated by the DLA to cushion the negative effects of inland positioning and loss of intermediate inventories was the Top 100 program. The Type Commanders requested each afloat supply officer to provide the Top 100 items he would like to see stocked at FISC Norfolk. Despite the program's good intentions, DLA canceled it. DLA initially wanted to position material condition degrader spares near the fleet.<sup>18</sup> The ships provided lists of predominately consumable, high usage, and never-out type items. Supply Officers listed material provided by GSA more than DLA or Navy material.

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<sup>15</sup> Edward Straw. "Military Service Logistics Data Required to Support Depot Consolidation and Stock Positioning Initiatives." Letter to military service logistics chiefs from Commander, Defense Logistics Agency. 24 June 1993.

<sup>16</sup> Michael Riley. "Dedicated DLA Support To Tidewater Areas." Trip report. 15 Oct. 1993.

<sup>17</sup> Donald Hickman. "DLA: Looking to the Future." Briefing charts. 8 June 1993.

<sup>18</sup> Francis Poole. Personal Interview. 20 Dec. 1993.

# ANALYSIS

The DoD and Navy inventory programs and policies presented are a source of great change for the Atlantic Fleet. I will now discuss the pros and cons of each as I analyze them individually. I will also judge them as a whole. Are we doing the right thing? As stated in the beginning, this is a preliminary assessment of ongoing and incomplete change.

## ***Current Policy***

The current policy is working, but how well? I will analyze the system that exists based on the DMRD mandated changes and other recent changes.

**TWO ECHELON SYSTEM.** Can it work? Yes. It is working. However, is it the right system to ensure fleet combat readiness? While it may be too early to prove right or wrong, some observations are possible.

First, what is the purpose of supply inventories for a combat unit? They exist to ensure military operations support national military policy. To do this, forces must be currently ready and sustainable in case of commitment to combat. The two echelon system recognizes that major changes have occurred in the world that permit efficiencies. The old three echelon system existed for many years because of the feeling that redundancy was necessary to make up for "system" shortcomings. The shortcomings included funding variability, procurement lead-time, distribution/transportation, storage losses, and computer/information systems weaknesses.

Second, the two-echelon system required elimination of one level of inventory at many service sites worldwide. This allowed drawdown of those supplies in some cases without a buyer spending more DoD funds to repurchase replenishment material. It also enabled a transfer of Operations and Maintenance Navy (OM&N) funds back to the operators for reuse. This is a one-time savings that will continue until the exhaustion of the intermediate level of inventory. However, this puts an increased burden on the wholesaler to provide material more quickly than was the previous case.

**DLA CONSOLIDATED SUPPLY DEPOTS.** From the customers point of view, who owns wholesale material or its location should not be important.<sup>19</sup> The afloat Supply Officer wants the material within Required Delivery Date (RDD)/Uniform Material Movement and Issue Priority System (UMMIPS)--DoD standard maximum goals--time frames. The system of providing supply material should be transparent to the customer. However, FISC Norfolk bearer pickup and quick pick statistics for last year rose to 60K documents. This indicates that remote depots are not providing stock replenishment material according to UMMIPS standards.<sup>20</sup> Extra effort is required for ships to maintain readiness.

To ensure distribution system optimization without degrading fleet readiness, DLA, GSA, and the Navy Supply Systems Command must find the right combination of factors that make the distribution system transparent to the fleet. This involves many tradeoffs in the following areas:

- First destination transportation costs from the vendor to the storage site.
- Storage costs.
- Packaging for remote versus local delivery.
- Shipping costs from the storage site to the customer.
- Handling (receiving, pulling, packaging) costs at each additional site positioned or moved through.
- Opportunity costs and subsequent readiness degradation of non-availability of material near the customer.
- Cost to make short notice, massive consumable load out for contingency fleet deployment.

I believe that we did not achieve system optimization in the early restructuring for Navy support. The DLA depot operations personnel had the lead in setting the policy. They stored material based primarily on depot cost of operations. Since DLA depots were the least cost option, DLA stored most DoD material in their primary

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<sup>19</sup> Donald Hickman. Personal Interview. 6 Dec. 1993.

<sup>20</sup> Michael Olson. Personal Interview. 14 Oct. 1993.

distribution site depots.<sup>21</sup> This decision minimized depot operations costs but did not optimize the total distribution cost.

**DLA CLOSEST TO THE VENDOR POLICY.** The DORO Study stated clearly that the DLA's "Closest to the Vendor" Policy was not the most cost effective for the Navy. It wasn't the best based on cost or material availability. The main reason was that the Navy is concentrated in Norfolk and San Diego. It makes sense to store Navy unique and Navy primary-use material at those two primary sites.

**FISC CONCEPT.** The FISC concept affects the fleet in three primary ways. First, afloat Supply Officers have to interact with two different organizations, FISC and Defense Depot, where they formerly worked with one. Each operates with different procedures and regulations and have different bosses. Second, FISC and Defense Depot store material primarily for the Naval Aviation Depots, Shipyards, and local shore customers and not the ships. Third, with the reduction of the retail inventories and elimination of intermediate inventories, less material is available to support emergent requirements.

This represents a major change in the way of doing business for the afloat supply officer despite claims of no impact. Even if readiness statistics show no change, work procedures are more complicated.

**GSA PROCEDURES.** Lack of timely delivery of GSA material can cause the greatest problems for Atlantic Fleet ships. Loss of these high usage items from the intermediate inventory results in disproportionate management attention. While GSA presently stocks approximately 20,000 line items at their depots and have a fill rate of 96.5%, they refer many items for direct vendor delivery.<sup>22</sup> GSA stocks shelf-life material that includes most hazardous and flammable material on a dual method support basis. They stock these items for high priority, low volume issue only. Low priority or high volume requests are automatically referred for direct vendor delivery. Since most vendors produce these items on demand only, ships experience excessive delays. This is a major problem for ships trying to fine-tune their shelf-life material program prior to work ups and deployment. This may be an area that the FISC

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<sup>21</sup> William Brown. Personal Interview. 25 Oct. 1993.

<sup>22</sup> Gary Hood. Personal Interview. 24 Feb. 1994.

may have to manage on a special project with local retail stocks to guarantee ships receive more timely service.

The Director of Inventory Management at GSA Headquarters in Washington is concerned that the Navy and other services are living off the shelf since the forces draw downs and deletion of intermediate inventories began in 1992.<sup>23</sup> His statistics show a decline in overall demand despite a service policy of more referral. He is afraid that when local depot GSA material stocks are depleted, GSA will not have adequate stocks in its central warehouses to meet demand.

### ***Proposed Policy***

Since the start of the current policy, DLA, Naval Supply Systems Command, and customers provided feedback and evaluation. Based on the ongoing debate, some refinements were recommended. I will analyze some of the major recommendations.

**DLA STORAGE NEAREST TO THE CUSTOMER.** This is a much needed enhancement to optimize the system. While the system saves distribution costs by eliminating transportation and some packaging, the fleet gains material availability. This will prevent many CASREPS and work stoppages simply because material is available for bearer pickup. Expeditors will have fewer items to expedite and track through the distribution system. Generally, this change will provide better readiness at less cost.

**DISTRIBUTION/TRANSPORTATION ENHANCEMENTS.** One of the major reasons that allows elimination of intermediate inventories and remote storage of material is that our American transportation system has improved. Previous background discussion shows that responsive transportation--lower PLT--can make up for the loss and relocation of inventories. Our current system does not use the full flexibility of that system. Reliable overnight trucking and small package express service can make up for the fact that all material is not stored close to the customer.

The emergence of United Parcel Service (UPS), Federal Express (FEDX), and Express Mail along with many other "express" freight services recognizes that

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<sup>23</sup> Ibid.

American industry has already changed its business practices. The private sector relies on rapid transportation for "just in time" delivery of materials. This process demands, however, a shift in organization to put more resources (people) into managing transportation vice managing inventories. The good news is that it is cheaper to manage transportation service than to invest in the inventory itself and the equipment and facilities to handle and store it.

Dedicated daily truck service to Norfolk and San Diego from Defense Depots would achieve system responsiveness with some increase in trucking costs. Reduced air shipment, Quick Trans, and inventory carrying costs will offset this cost. Working with industry to retain inventories and ship material on demand would be the next area for DLA/Navy to explore. Centralized storage of material adjacent to Federal Express in Memphis may be another alternative if next day delivery could be guaranteed.<sup>24</sup>

**GSA WHOLESALE LEVEL NEAR THE FLEET.** GSA must follow DLA's lead and position (on a wholesale basis) Navy high use material in Norfolk and San Diego and other FISC's if possible.<sup>25</sup> This program would make up for the long lead-time to obtain GSA material and prevent stock outs. Since many hazardous items used in the marine environment are Navy sole use, it makes sense to store them near the Navy customer. Another option would be for DLA to take over distribution responsibility for GSA material used by the Navy and store the material near the fleet when it make sense to do so.<sup>26</sup> A final option is for the Navy to buy long lead-time and shelf-life GSA material for storage near the fleet. This recognizes the special management challenge of certain types of material as well as the special short lead-time demand patterns of ships.

### ***Unique Atlantic Fleet Requirements/Operations***

Unlike other DLA and GSA customers, the mobile nature of ships, submarines, and

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<sup>24</sup> Edward Straw. Personal Interview. 31 Jan. 1994.

<sup>25</sup> J. D. Maynard. "GSA Wholesale Asset Positioning at Norfolk." Point Paper. Undated.

<sup>26</sup> Edward Straw. Personal Interview. 31 Jan. 1994.

embarked air squadrons is unique. In the past, supply inventories at all levels helped mitigate the vagaries of the naval operational environment.

**OPERATIONAL SCHEDULE IMPACTS INVENTORY LEVELS.** While the warehouse location of the material has little effect on a ship while it is on deployment, the location is very important for ships in homeport. Since this is where most of the heavy maintenance and stores loading occurs, timing of delivery of material is critical. The naval station Defense Depot holds material ordered for stock replenishment for ships operating in the Atlantic and Caribbean. When ships return to homeport, they load the material. This means that ships do not receive a steady flow of stock replenishment material like all other "system customers." Material that arrives at homeport on the day a ship goes to sea may not be received onboard the ship for issue for a month or more.

In the past, Navy Supply Centers made up for scheduling variability by issuing all issue groups of material to ships before their departure from port. This kept shipboard levels of stock material availability at its highest. This was also a most economical system since ships at sea require less expediting and premium transporting of NIS material. The DLA primary distribution sites and GSA do not provide this customized service.

**MAINTENANCE PROCEDURES.** Besides being combat units, Navy ships are large industrial activities that work seven days a week, 24 hours a day. Preventive and corrective maintenance on shipboard systems go on constantly. Because of this ships use repair parts and consumable maintenance material at all times. Shipboard supply departments issue material and prepare documentation for requisitioning parts from the FISC around the clock. With the loss of the intermediate inventory and remote storage of material, more work stoppages will occur in shipboard maintenance. This must have a readiness impact in addition to the workload increase in obtaining the parts.

**CASUALTY REPORTING (CASREP) SYSTEM.** One impact of more work stoppages is that the CASREP (major material system out-of-commission) rate will go up. Degraded readiness in major weapons systems is measured partly through this system. CASREPs are not submitted when parts are available at the FISC. An increased CASREP rate has a greater impact than just more systems being inoperable. More CASREPs create

a larger workload on the personnel at all levels in procuring and expediting the parts. The system slows and becomes less responsive. One system of measuring readiness, number of CASREPs per ship, will go up.

Another important factor is that with more CASREPs generated inport, more ships will sail in degraded status. Also, some types of maintenance can only be performed inport. That means that more ships will miss sailing commitments. Finally, with reduced maintenance and spares budgets, more maintenance is deferred--not being done. That will eventually cause more CASREPs for operating ships. Unfortunately, the type parts required will likely be those not stocked by the ship and require longer lead-times to procure.

The pessimistic situation I described above has not occurred to a great extent yet because spares are still available. They have not attrited from the FISC's and are still physically located on the waterfront-adjacent to the ships. Also, redistribution of excess material and decommissioned ship material has kept many parts at local sites filling emerging requirements. Another action that may be masking the long term challenge includes the fact that older ships with older systems are being decommissioned first. That produces a short-term maintenance benefit. A readiness enhancer is that many new systems are more reliable.

**SURGE--DESERT STORM SCENARIO.** Can we surge for another Desert Storm? The consensus gathered from several senior Supply Officers is that we can.<sup>27</sup> Some feel, however, that we may not a year from now. The main reason is that we still have the intermediate inventories on hand but are drawing them down. We are issuing parts that won't be there in the future. Also, we are still provisioning with the same formulas as in the past. Despite the policy to reduce inventories, we still haven't cut our system buys in all cases to recognize consumer inventory reductions or intermediate inventory deletions. This will change and be felt.

### ***Other Inventory Management Changes In Work***

**CONSUMER INVENTORY TRANSFER (CIT).** Continuing with a program that started

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<sup>27</sup> Donald Hickman. Personal Interview. 6 Dec. 1993.

many years ago, the Navy is still transferring inventory management of more material to DLA. The DLA item manager who picks up this Navy material is directed to store it at DLA PDSs. This will occur although the Navy is the only user of the items.<sup>28</sup> This policy will probably be changed when DLA stores Navy material closest to the customer. Fortunately, Navy material at Navy sites will not be moved to DLA depots for storage. It will be drawn down locally before positioning of new buys.

**INVENTORY REDUCTIONS AFLOAT.** A major program to reduce inventories afloat on active ships is now underway--AVCAL (aircraft parts) and COSAL (ship parts) Reduction Program. Ships require this program because they had excesses of stock that did not move--no demand in three years or more. This program freed up space for better storage of material that does move. It also permitted redistribution of material to ships with shortages. Finally, material turned into Defense Depots have system-wide visibility for reissue. This prevents new buys for material the Navy already owns.

**READINESS BASED SPARES (RBS).** This is a concept with great potential for major savings now and in the future. This allowance computation technique provides a predetermined level of readiness at a reduced inventory cost. It was recently implemented onboard two Atlantic Fleet aircraft carriers. It involves removing expensive aircraft spare parts--range and depth--and adding back more range and depth of less expensive spares. Based on historical usage that includes intermediate repair capability, we can compute a given change in readiness of the systems involved. Then we decide what systems to degrade and by how much. The point is that the criticality of the system may not be related to the cost to maintain it.

The Readiness Based Spares program has great potential for all provisioning in the future. More testing will prove its utility. One negative effect of RBS is increased cannibalizations. This occurred despite improved turn-around-times in the intermediate repair effort. The full benefit of this program will not be achieved, however, unless the inventory manager avoids buys and reduces total system stock through attrition. The challenge is to find the right mix of spares to obtain optimum

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<sup>28</sup> Michael Olson. "DoD Wholesale Stock Positioning." Point Paper. 8 Oct. 1993.

readiness.<sup>29</sup>

**FINANCIAL RESTRICTIONS.** DLA is under a financial restriction that limits the stock material that it can buy. It currently buys back for stock 82 cents on a dollar of sales. This will automatically attrite a fifth of DoD's inventories over time. The problem is to ensure the right material is fully funded while slow moving or obsolete material attrites. The lead-time issue further compounds the problem. Some material requires months or even years to procure. Since vendors try to produce at the most efficient production levels, Navy readiness suffers when spares are not available on the shelf. The Navy must wait for production of items when it is favorable for the vendor. Also, if the item is urgent, short production runs mean higher cost. Much of the Consumer Inventory Transfer (CIT) material fits into this category. This material will be sold off the shelf at the Navy site then not bought by DLA until the next demand. The lead-time at that point may present a problem. The good news is that DLA was originally cut back to buying back 65 cents on a dollar of sales. The DLA commander fought to recover 17 cents.

**READINESS TEAM.** Possibly the biggest change that will affect readiness in the next ten years is the dismantling of the "readiness team." With the early retirement of many of our most experienced officers and senior enlisted to include a reduction of training opportunities, the key to our past success may be slipping away. The Atlantic Fleet Supply Officer offered, "While system changes may affect the Fleet for better or worse, the change will probably be marginal. The primary readiness driver is people. . .specifically, those people who actually repair ships and airplanes. Should these highly trained people. . .the maintainers, the 'wrench turners'. . .leave the Navy, our system will not work."<sup>30</sup>

### ***Readiness Impacts***

The primary goal of these inventory management changes is to save scarce DoD dollars. That goal is being achieved. Is it being done without affecting readiness? Did the drafters of DMRDs 901 and 902 achieve a readiness neutral change or did

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<sup>29</sup> Francis Poole. Personal Interview. 20 Dec. 1993.

<sup>30</sup> David Ruble. Personal Interview. 21 Dec. 1993.

they choose not to address readiness because it was "too hard?" Are we safeguarding readiness today as we make other major changes?

**READINESS MEASUREMENT.** The consensus among those I interviewed is that it is difficult to accurately measure readiness. It is too complex and too much of a moving target. Even if we could measure readiness, we couldn't agree on how much is enough. So when we talk of improving or declining readiness, we mean that certain indicators of readiness are going up or down. These could include some of the following: time between CASREP and casualty correction (CASCOR) or average customer wait time (ACWT), CASREPs totals, #CASREPs per ship, #CASREPs per certain weapons systems, NOT MISSION CAPABLE/PARTIAL MISSION CAPABLE status, system supply availability of parts, ship availability of parts, Not-In-Stock rate, Not Carried rate, or others not listed. Measurements of fleet readiness, ship readiness, aircraft squadron readiness, or supply department readiness may not be directly correlated. We must find the right measure of readiness that permits naval commanders to determine the "true" condition of his forces. We do not have a consensus measure today.

**PERCEPTIONS OF CURRENT READINESS.** There is a perception by some fleet personnel that readiness is declining.<sup>31</sup> Statistically, supply availability has declined. This alone does not prove that readiness has declined. Ship's Parts Control Center (SPCC) CASREP statistics show an improvement in all indicators from 1992 to 1993 as listed in the following table:

**CASREP MRRT, MST, AND MRSPT<sup>32</sup>**

	FY 91	FY92	FY93
OVERALL MRRT	15.1	14.1	13.7
OVERALL MST	8.8	8.2	7.9
OVERALL MRSPT	6.1	5.6	5.4

MRRT (mean requisition response time), MST (mean shipping time)

MRSPT (mean requisition submission and processing time)

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<sup>31</sup> R. E. Brune. "DLA AO-AS Time Frame." PMOLANT Analysis Division Study. 2 Nov. 1993.

<sup>32</sup> John Russ. CASREP MRRT, MST, and MRSPT--Fiscal Year Averages. SPCC Code 0313 Briefing Charts. 1993.

However, parts are no longer as available locally as often. Because customers must exert more effort to obtain parts, their feeling is that things are worse. We really don't know the full effects of the changes affecting parts availability because some changes are offsetting such as the drawdown of ships and aircraft that reduces demand for parts.

**REAL CHANGES IN READINESS.** Real world changes that may affect readiness are:

- The defense industrial base is eroding. Many suppliers are going out of business. Some necessary replacement spare parts may not be available quickly at any price.
- More cannibizations are necessary to maintain the same level of readiness.
- Funding problems are lowering system supply availability of spares.
- The full impact of the changes aren't apparent yet because we still have much of the deleted inventories.
- Personnel training is being reduced. A highly trained and motivated career force is still in place. This force will deteriorate with reductions and lower promotion/advancement opportunities.
- Ship and aircraft maintenance is being cut back. This will cause more corrective maintenance in the future. The spares will not be there to support this increase.

The human factor ensures reported readiness statistics stay high. Sailors working harder or managers "playing" with the system are two possible reasons. There is a potential to keep "reported readiness" high while "real readiness" declines. Current system managers have a strong bias against showing a decline in readiness. True readiness may be lower than reported at every level.

**CHANGE GOALS.** Should we change readiness goals based on a different threat than worldwide war with the Soviet Union? Should goals be more cost based than before? Are the current goals realistic? Do the various component goals support an overall system readiness goal? Can we agree on a mix of goals that produce readiness? Now is the time to address these questions and establish honest, reasonable goals that we can afford. The consensus of senior supply officers is that we should not change the goals.

# CONCLUSIONS

Despite the difficulties raised, I am optimistic that we are fashioning a better supply system at lower cost. There are, however, many changes that we must make. Now is the time. Before offering some alternative courses of action and my final recommendation, I present some conclusions based on my research.

**1. Inventory cost savings from the DMRD process are possible and still maintain readiness.**

Changes in the world threat situation along with technology changes in transportation and information services make adjustments to the DoD inventory management system possible. Savings are already being realized through inventory reductions and consolidations of storage sites. I believe readiness can be maintained with further refinements to the changes already introduced. In my opinion, however, readiness will decline in the next year without major enhancements I present in my recommendations.

**2. Readiness should be better defined and affordable.**

Inventory managers use traditional stovepipe methods to manage individual parts of a large system. They sub-optimize at each level by meeting goals developed for the individual parts and not coordinated as parts of a whole. Any system will adapt to meet expectations of a measurement system. This can be functional or dysfunctional. DoD logisticians and operators must more accurately define readiness and how the "whole" system supports it. We must develop cost tradeoffs with operating schedules, major maintenance, and preventive/corrective maintenance so we can manage readiness at an acceptable price. We must not deceive ourselves into thinking the system is still performing as well as it did in the late 1980's when funding was at its peak--unless it "really" is. Supply and maintenance professionals must be honest with the operators on the true state of current and projected readiness.

**3. All inventory changes should be considered as parts of a total package and the readiness impact considered in advance.**

The many inventory policy changes, "twisting knobs", discussed above are being done separately by different activities to achieve similar but different goals. They should be integrated into a coordinated program with central direction. With so many things happening simultaneously, it will be difficult to know with certainty what worked and what didn't. It is not good enough to "assume" no effect on

readiness.

**4. Modern transportation and information services can support inventory reductions and consolidations.**

DoD should follow industry lead and use "bottom line" techniques as much as possible. We can avoid major investment in inventories by intelligent and aggressive use of currently available transportation and information services. We must develop an organizational culture that moves as fast as American business supported by proper budget and procurement regulations. Worldwide visibility of assets, instant communications, and rapid movement of parts anywhere in the world can increase readiness while reducing inventory. Location of parts should have minimum impact on the timeliness of repairs.

**5. Fleet operators must feel minimum impact of changes and be informed of the effect up front.**

Defense inventory systems exist to ensure fleet support by the world's best supply agencies. Inventory management changes do have impact though. Change must be explained to commanders and commanding officers in advance. Training in new systems must be conducted up front. Different ways of doing business must be sold to all concerned so the changeover period is smooth and fully achieves the potential. These changes must be a team activity.

**6. Good people are required to make any system work.**

Highly trained, experienced, and motivated people are adept at delivering readiness at the required level. The problem we now have is that the team is breaking up. The readiness facilitators, especially the maintainers, are leaving or retiring in response to reduced promotion opportunity and the fifteen year retirement. People who made the system "work" better in the past may not be there in the future to guarantee the new "system" continues at the same level. Commanders must ensure team training and retraining is a key goal to guarantee they can maintain the more complex systems of the future.

## **WHAT CAN WE DO?**

Considering that the Soviet Empire no longer threatens World War III, now is the time to make major changes to the DoD inventory management and supply system. Since these changes may challenge our ability to maintain readiness during the transition period, there may be no better time to accept the risk.

### **OPTION 1. Total overhaul of our inventory management system.**

This option calls for these additional changes to those already initiated:

- Use the Readiness Base Spares model as a pattern for the entire repairables management program.
- Change readiness goals to lower levels to reflect changed threats and increased response times allowed.
- Change the CASREP system that recognizes longer lead-time for procurement of spares that are remotely located from fleet
- Shift emphasis from buying large inventories with widespread distribution to smaller inventories with more centralized distribution.
- Put greater emphasis on transportation services to offset smaller, less widespread inventories.
- Use local suppliers for common material. Have GSA and DLA set up local contracts for delivery of material that suppliers own until the fleet needs them.
- DLA should take over management of GSA wholesale stocks and position a portion of them at the FISC's.

### **OPTION 2. Maximum cost savings approach to inventory management.**

This options calls for these additional changes to those already initiated:

- Move maximum material to centralized storage sites.
- Reduce inventories held by government to a minimum.
- Reduce readiness goals to lower levels to match lower system responsiveness based on cost savings.
- Centrally control all Navy material and shift between fleet units on a self-help basis thus minimizing new buys.
- Management assumption by DLA of GSA wholesale stocks. Position long lead-time shelf-life items only at the FISC's.

### **OPTION 3. Maximum use of transportation and information services.**

This option calls for these additional changes to those already initiated:

- Use transportation services to the maximum to maintain readiness at current levels. Put more resources and management attention in this most promising cost savings and readiness enhancement area.
- Link ADP ordering procedures at FISC and wholesale activities to minimize wait times for requisitions in the processing period.
- Centrally control all Navy material with transaction reporting computer system that permits central and positive control of all assets.
- Management assumption by DLA of GSA wholesale stocks and position a portion of them at FISC's. GSA continue ownership of the inventory.

## RECOMMENDATION

The DoD material positioning policy along with deletion of the intermediate inventories has the potential to negatively impact the fleet. With decommissioning ships resulting in shifting of material and the fact that most intermediate inventories still are present at FISC's, the real impact hasn't been felt. Atlantic Fleet readiness will become more critical in the future as fewer ships and aircraft require high real readiness.

I recommend implementation of **Option 3** as soon as possible. The Navy should take the lead from the private sector and make material transportation and distribution a key element of further inventory savings to maintain or even enhance readiness. Current and proposed ADP and information systems along with enlightened management of these resources will ensure reduction of inefficiencies. The cost to implement will be minimum. However, it will take time to realize the savings. It will take a total change in the way we conduct Navy and DoD supply and distribution.

Readiness doesn't have to be a victim of smart business decisions that save scarce national resources--budget dollars. Use of modern transportation and information technologies can produce the right product at an affordable price. We must do the right things today to guarantee a ready and sustainable Navy of tomorrow.

## Sources

- Brown, William. Personal Interview. 25 Oct 1993.
- Brune, R. E. "DLA AO-AS Time Frame." PMOLANT Analysis Division study. 2 Nov. 1993.
- Defense Management Report Decision 901. "Reducing Supply System Costs." Nov. 1989.
- Defense Management Report Decision 902. "Consolidation of Defense Supply Depots." Nov. 1989.
- Defense Operations Research Organization. Comparative Cost and Support Pattern Analysis For High Demand Navy Customers Under A Single Site Storage Option. July 1993.
- Department of Defense. Material Distribution System Study. Prepared for the Joint Logistics Commanders (JLC). July 1978.
- Department of the Navy. FROM THE SEA--Preparing the Naval Service for the 21st Century. 1993.
- DeGuia, Edward. Personal Interview. 18 Nov. 1993.
- Hickman, D. E. "DLA: Looking to the Future." Briefing charts. 8 June 1993.
- Hickman, D. E. Personal Interview. 6 Dec. 1993.
- Hood, Gary. Personal Interview. 24 Feb. 1994.
- Hood, Gary. Briefing charts. General Services Administration (GSA) Systems, Inventory & Operations Management Center. 1993.
- Maynard, J. D. "GSA Wholesale Asset Positioning at Norfolk." Point Paper. Undated.
- McCausland, Charles. "Supply Consolidation Plan." Memorandum for Assistant Secretary of Defense (Production and Logistics) from Commander, Defense Logistics Agency. 10 Oct. 1990.
- NAVSUP INSTRUCTION 4441.27. "Requirements Determination For The Naval Supply System." 12 Dec. 1989.
- Norfolk Center "Flash." Implementation of DoD Defense Management Review Decisions; Elimination of 9 COG Retail/Intermediate Levels At Naval Supply Centers. Fleet Industrial Supply Center, Norfolk. Defense Depot Norfolk, Va. 25 Jan. 1993.
- Olson, Michael. "DoD Wholesale Stock Positioning." Point Paper. 8 Oct 1993.

Olson, Michael. "DORO Stock Positioning Study." Meeting Notes from 24 June 1993 meeting at Defense Operations Research Organization (DORO), Richmond, Va.

Olson, Michael. "Inventory Issues at FISC Norfolk Today." Supply Corps Newsletter.

Olson, Michael. Personal Interview. 14 Oct. 1993.

OPNAV INSTRUCTION 4441.12B. "Retail Supply Support of Naval Activities and Operating Forces." 25 May 1983.

"Placement of 'GSA' Wholesale Material at FISC Norfolk." Fleet Industrial Supply Center, Norfolk, VA. Briefing Charts. Undated.

Poole, Francis. Personal Interview. 20 Dec. 1993.

Riley, Michael. "Dedicated DLA Support To Tidewater Areas." Trip report. 15 Oct. 1993.

Riley, Michael. "DLA Stock Positioning." Telephone call notes. 29 Oct. 1993.

Riley, Michael. "Richmond Meeting With DLA and DORO." Meeting notes from 24 June 1993 meeting at DORO, Richmond, Va.

Riley, Michael. Personal Interview. 8 Oct. 1993.

Ruble, David. Personal Interview. 21 Dec. 1993.

Russ, John. CASREP MRRT, MST, and MRSPT--Fiscal Year Averages. SPCC Mechanicsburg, PA Briefing Charts. 1993.

Straw, Edward. "Military Service Logistics Data Required to Support Depot Consolidation and Stock Positioning Initiatives." Letter to military service logistics chiefs from Commander, Defense Logistics Agency. 24 June 1993.

Straw, Edward. Personal Interview. 31 Jan. 1994.